Technical Memorandum

Environmental Resources Management

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To: Ms. Donna Ortiz /Washington State Department of Ecology

cc: Ms. Shawn Lilley / Glacier Northwest, Inc.
Mr. John Oldham / Reichhold, Inc.

From: Ms. Laura Tesch and Mr. Erik Ipsen / ERM-West, Inc.

Date: 13 November 2009

Subject: Historical Storm Water Pipe Investigation
Glacier Northwest, Inc.-Reichhold, Inc. Site
5900 West Marginal Way SW, Seattle, Washington

INTRODUCTION

ERM-West Inc. (ERM) has prepared this Technical Memorandum on behalf of Glacier Northwest, Inc. (Glacier) and Reichhold, Inc. (Reichhold) to summarize the activities and results of the historical storm water piping investigation conducted on the southern portion of the Glacier property (also referred to as the Glacier-Reichhold Site) located at 5900 West Marginal Way SW, Seattle, Washington (the "Site"). This investigation resulted from an evaluation of potential data gaps at the Site based on a City of Seattle GIS utilities map. The office and field activities conducted during this investigation were performed pursuant to the Remedial Investigation/Feasibility Study activities under Agreed Order No. 6000 between the Washington State Department of Ecology, Glacier, and Reichhold to identify and confirm the presence of this storm water piping at the Site.

The City of Seattle's utility map identifies storm water piping and five catch basins on the southern portion of the property that were previously unknown to Glacier personnel and are not associated with the current operating storm water system on the northern portion of the property. The storm water piping shown on the map appears to tie into the City of Seattle Public Utilities' (SPU's) storm drain along the Port of Seattle's T115 North Access Road. While this storm water feature shows up on historical utility drawings, no above-ground signs of the storm water system (e.g., catch basins, manholes, etc.) are currently visible.

A description of the investigation activities and results to obtain information regarding the possible historical storm water system at the Site is presented in this Technical Memorandum.

RESEARCH

To better understand the current and historical infrastructure at the Site, ERM obtained a current utility map for the Site from the City of Seattle's Department of Planning and Development. The GIS utility map (see Appendix A) shows a number of water, storm water, and sanitary sewer mainlines running north/south along a utility corridor beneath West Marginal Way. On-site water and sanitary sewer connections are shown to the maintenance building in the northwest portion of the Site. Additionally, a storm water line is shown on the southern portion of the Site that appears to drain toward the south into a storm water line that travels east-west along the North Access Road to the Port of Seattle's T115 property, which discharges to the Lower Duwamish Waterway.

To further investigate the reported storm water piping on-site, ERM utilized the website of the City of Seattle's Department of Planning and Development, which provides an online database of side sewer cards (for private properties, not major sewer arterials) for a selected parcel within the city limits. An online search identified side sewer card 4878-31, which shows the storm water piping at the Site identified on the City of Seattle's utility map. The side sewer card drawing shows that the piping is 15 inches in diameter with five catch basins. It also shows that the southern end of the 15-inch piping is tied into the City of Seattle SPU's 48-inch storm water line, which is present along the North Access Road to the Port of Seattle's T115 property. A copy of the front and back of side sewer card 4878-31 is included as Appendix B.

Based on the permit information recorded on side sewer card 4878-31, ERM worked with the City of Seattle personnel to procure an as-built drawing of the Site storm water system with hand-written permit and piping tie-in air test information dated 18 April 1975. The as-built drawing (see Appendix C) provides dimensions and depths of the on-site 15-inch diameter pipe noting that it is constructed of reinforced concrete pipe (RCP). The drawing, shown at a 1"=50' scale, also depicts the locations, invert elevations, and top elevations of the five on-site catch basins located in the Site parking area (elevations are relative to an unknown vertical datum) as well as connecting storm water piping locations, sizes, and materials.

In November 2008, ERM spoke with a representative of the City of Seattle SPU about the historical site storm water network. The representative confirmed that no permits were issued by the City of Seattle to abandon

the network, though based on SPU experience, it may be unlikely that a permit would be requested in actual practice. The representative also stated that if the pipe were cut and capped a permit would be required; however, if the catch basins were abandoned in place (filled with concrete or covered with a plate), then a permit is not necessarily required.

SEATTLE PUBLIC UTILITY 48-INCH PIPE VIDEO SURVEY

Since there is not a manhole constructed at the location where the Site storm water pipe was identified on the drawings to tie in with the City of Seattle SPU 48-inch storm water pipe, ERM contracted with Applied Professional Services (APS) of North Bend, Washington to conduct an in-pipe video survey along a section of the 48-inch pipe to confirm if the tie-in was present. On 30 July 2009, APS used a video camera controlled remotely by an operator in a television truck to video record the interior of the 48-inch pipe. The camera was introduced into the pipe at a manhole downstream (east) of the reported tie-in location along the North Access Road and driven upstream (west). The video survey confirmed the presence of a tee approximately 45 degrees from the top of the pipe toward the north (direction of the Site). The footage tracker on the camera equipment estimated the distance between the manhole and the tee to be approximately 93 to 95 feet west (i.e., toward West Marginal Way SW) of the manhole. The estimated tie-in location was marked on the street surface and was oriented in the center of the south driveway that provides access to the Site. Based on video observations, an estimated 2 to 3 inches of water was observed to be flowing slowly in the 48-inch diameter storm pipe. No water was observed to be discharging from the 15-inch tie-in.

The video survey conducted by APS is included on CD-ROM in Appendix D.

JULY 2009 EXCAVATIONS

On 27 and 30 July 2009, ERM worked with Glacier personnel to locate and excavate the five catch basins identified on the side sewer card and as-built drawing. The catch basin locations would be located in the gravel parking area on the southern portion of the Site. Gravel surfacing has been repeatedly placed in the parking area over the years due to the high volume of concrete trucks that drive and park in the area. It is believed

that the ground surface on the southern portion of the Site has been raised by a few feet due to this practice.

The as-built drawing was used to mark off the distance between the identified tie-in location and the first catch basin to the north and one to the east. A metal detector was used to attempt to locate the metal grate generally used on the top of catch basins. Four potential locations were identified with the metal detector in the vicinities of the reported central and eastern catch basin locations. A backhoe was used to excavate pits in the four identified locations. The pits were excavated to depths between 3 and 8 feet below grade. Excavations were not continued below this depth as it is believed that the surfaces of the catch basins would be found at depths no more than a few feet below grade when considering gravel resurfacing that is routinely completed in the parking lot. No catch basins, nor additional storm drain piping were identified at either of these locations during these excavations.

The excavation areas were backfilled, compacted and resurfaced after the excavations were completed. The approximate attempted catch basin location excavation areas from the July 2009 Site activities are shown on the site map in Appendix E. Photographs of the excavation areas are included in Appendix F.

OCTOBER 2009 EXCAVATIONS

On 7 October 2009, ERM worked with Custom Backhoe, an environmental excavation contractor out of Bellevue, Washington, to remobilize equipment to the Site to verify the existence and location of the reported 15-inch diameter pipe believed to tie into the 48-inch diameter SPU storm line south of the Site. A front end loader and backhoe were used to excavate an 18-foot long, 3-foot wide trench across the southern access drive on the Site property, where the as-built plans showed the pipe, and the tie-in location was shown on the camera survey.

The material in the upper 1 foot of the excavated trench consisted of gravel parking lot surfacing underlain by approximately 1.5 feet of very hard concrete fines/fill. This surface fill material was underlain by dark, silty fines beginning at approximately 2.5 feet below grade. This material is believed to be historically dredged fill material used to grade the Site. At approximately 8 feet below grade, the top of the 15-inch RCP pipe was discovered. The soil around the pipe was carefully cleared to provide

good visual confirmation of the pipe, which appeared to be in very good condition. The soil around the pipe was identified as the dark, silty, dredged material observed at a similar depth across the Site. Granular pipe bedding, generally used in standard piping installation construction methods underneath and as fill around the pipes, was not observed around the pipe. The underside of the pipe was not observed as the pipe was only able to be excavated around the sides of the pipe to approximately half its diameter (depth). No water was observed along the exterior of the pipe or in the fill material. Photographs of the trench and storm water pipe are included in Appendix F.

After the segment of storm water pipe was located, ERM personnel attempted to locate the reported Site catch basins to the north based on the observed alignment of the 15-inch diameter RCP and the distances to the catch basins scaled off the 1975 as-built drawing. A metal detector was used to search for signs of the catch basins (e.g., the metal grates or manhole covers) and marked several potential excavation locations in the vicinity of the noted catch basins. A "T"-shaped area approximately 19 feet wide by 17 feet long was excavated to an approximate depth of 11 feet below grade, but neither the catch basins nor the 15-inch diameter RCP pipe connecting them were located.

The excavation areas were backfilled, compacted, and resurfaced on 8 October 2009. The southern trench and northern excavation area from the October 2009 Site activities are shown on the site map in Appendix E.

CONCLUSIONS AND RECOMMENDATIONS

Research identified the reported presence of a historical storm water pipe and catch basins on the southern portion of the Site. Field activities confirmed the presence of a portion of the 15-inch diameter pipe (constructed of RCP) and a pipe that ties into the City of Seattle SPU storm water pipe south of the Site. However, none of the five catch basins shown on historical Site as-built drawings, or additional 15-inch piping were located in the field using a metal detector and significant lateral and vertical excavation test pits in multiple locations.

The main purpose for the storm water piping investigation was to determine whether the piping and catch basins identified on historical drawings were present on the southern portion of the Site. The objective, once located, was to evaluate the pipe's condition, whether the piping was

connected to the SPU 48-inch pipeline and to also determine the potential for the storm water piping to act as a preferential pathway for contaminant migration off-Site. This storm water piping does not appear to present a migration pathway concern due to the following findings:

- Granular pipe bedding material was not observed around the storm water piping exposed during this investigation, which would need to be present to act as a preferential pathway;
- The external portions of the 15-inch RCP pipe exposed during this investigation appeared to be in very good condition, which prevents potential contaminants from surrounding fill material from entering the storm water pipe and migrating off-site;
- According to the as-built drawings, the storm water piping and catch basins were installed in 1975, which post-dates historical production operations at the Site; and
- The 15-inch RCP pipe is not part of Glacier's current storm water collection system and there has been no industrial development of the southern portion of the Site.

This investigation was completed to gather information on the presence, alignment, and condition the noted historical storm water pipe and catch basins at the Site. As a result of this investigation which included a records review, an in-pipe camera survey, and multiple test pit excavations, it is recommended that the 15-inch pipe which was located be abandoned by cutting and capping the pipe near the south entrance of the property, as well as obtaining any permits identified by the City of Seattle required to complete the abandonment in this manner.

Appendix A
City of Seattle Site Utility Map

5906 W. Marginal Way SW - Site Utility Map

5600
5901
5658
5901
5955
5906
6000
10
20
30
40
50
60
70
80

0 100 200
FEET

Parcel Line
10' Interval Contour *
2' Interval Contour *
Waterbody
Pavement Edge
9999 Address Number

WATER UTILITY LEGEND
Water Mainline
Water Service
Hydrant

DWU UTILITY LEGEND
King Co. Sanitary Mainline
Sanitary Mainline
Drainage Mainline
Drainage Lateral (Inspected)
Drainage Lateral (Not Inspected)
Side Sewer (Inspected)
Side Sewer (Not Inspected)
Abandoned Pipe
Arrows designate direction of flow

ROOF OUTLINES INTERPRETED FROM JULY, 1999 ORTHOPHOTOGRAPHY
Building
Garage
Deck
Patio
Obscured
Misc.

PORTION OF:
C.G.D.B. Tile # 130
1/4 Section-Tnshp-Rng: SE19 –24 –4

* DATUM: NAVD88

NOTE: Conversion from City of Seattle Datum to NAVD88 Datum
To convert between City of Seattle and NAVD88 Datums, use:
("City of Seattle Datum" + 9.7ft = NAVD88).
There are inconsistencies in the City of Seattle Datum, the conversion may vary up to +/–1ft in specific areas throughout the City. In areas and applications where a more accurate conversion factor is critical, elevations should be field checked and vertical relationships between the two datums be determined for that particular area.

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No warranties of any sort, including accuracy, fitness or merchantability, accompany this product.

Produced by the Seattle Public Utilities –Geographic Systems Section on November 04, 2008

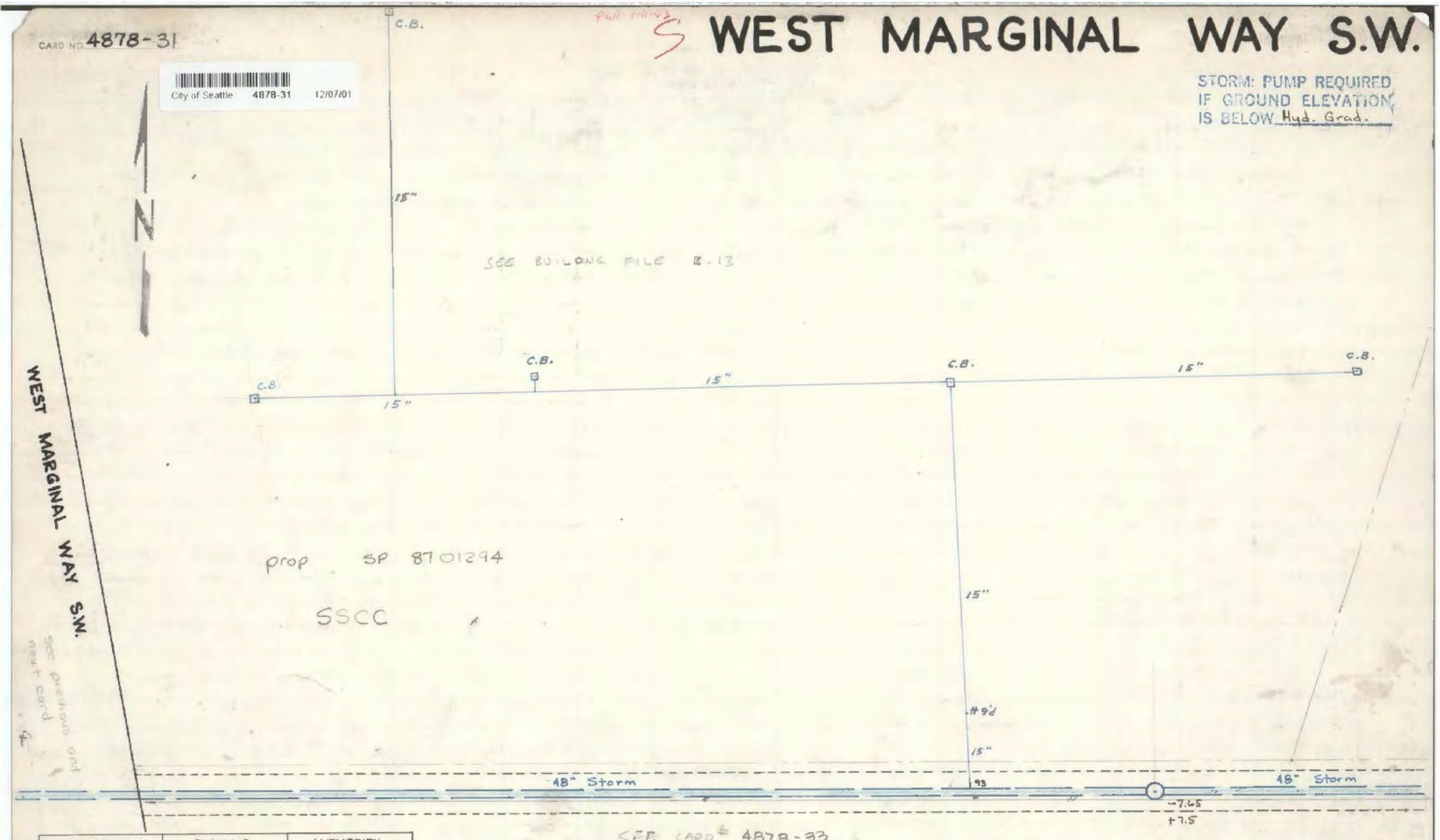
Appendix B
Side Sewer Cards

CARD NO. 4878-31

City of Seattle 4878-31 12/07/01

WEST MARGINAL WAY S.W.

STORM: PUMP REQUIRED
IF GROUND ELEVATION
IS BELOW Hyd. Grad.



IMPROVEMENT	PLAN NO.	AUTHORITY

CARD MADE 5-29-75 EB.B.

City of Seattle 4878-31-B 12/07/01

CB 7.235

FORM 88-196

THE CITY OF SEATTLE

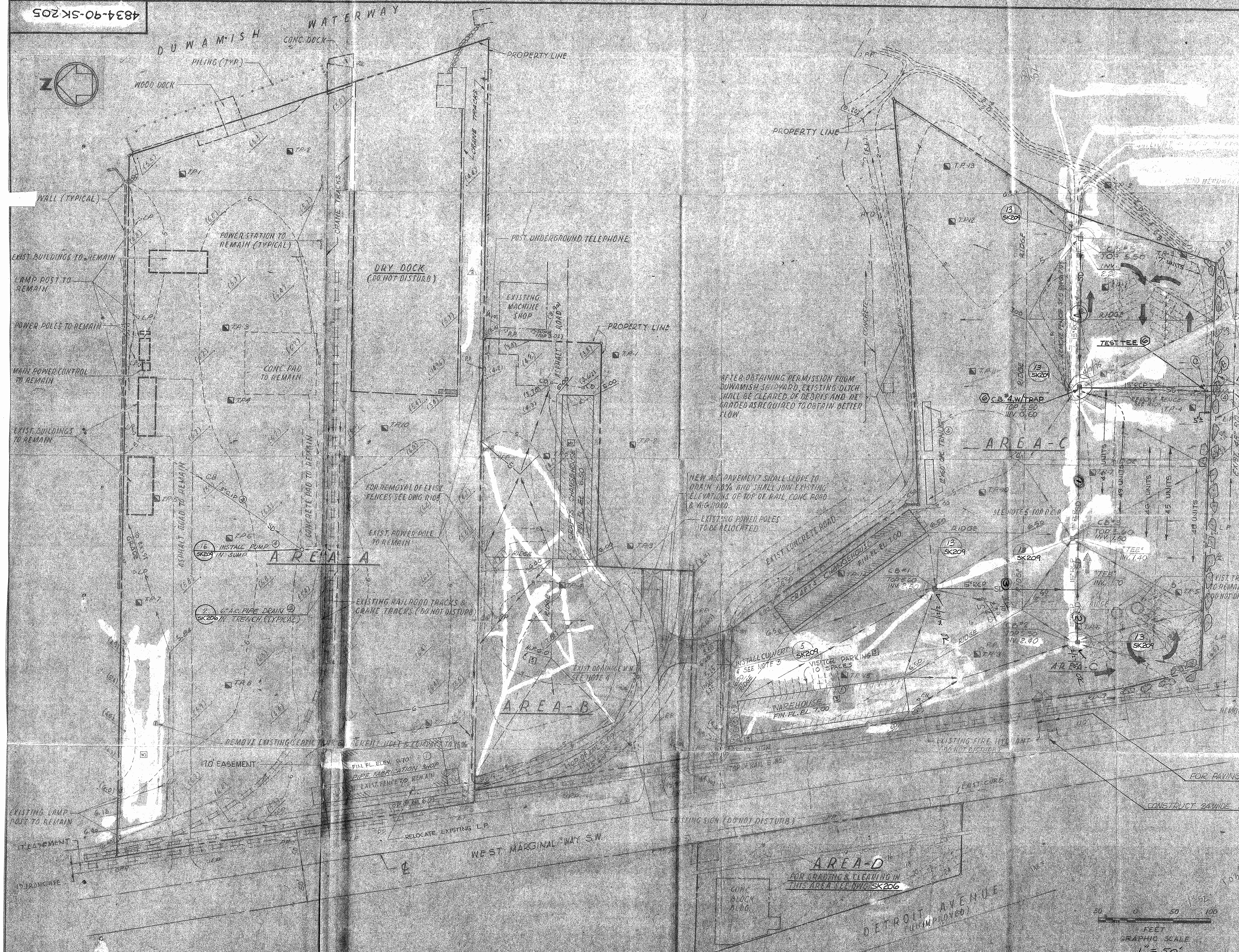
DEPARTMENT OF ENGINEERING

MAINTENANCE DIVISION

HOUSE NUMBER	PERMIT AND PLAT NO.	DATE ISSUED	ISSUED BY	OWNER	CONTRACTOR	INSPECTOR	DATE INSPECTION	FEE	LEGAL INSTRUMENTS	REMARKS
5940	P6786	2-13-75	WITHROW	ARCO (Ralph M. Parsons)	General-Haskell-AMELCO	TENERELLI	4-8-75	$100.00	R.D.# 7504160549	15" ON 48" GRAFT, W.O.# 612601 inside storm - 5 C.B.'s

Appendix C
Site Storm Sewer As-Built Drawing

4834-90-SK205



AS BUILT!

A. 15" on 48" TEE graft 93'W MH 10'd.
B. END 15" PSD 32'N & 94'W MH 9'd.
C. 15x15 TEST T. 40'N & 96'W MH (±) 9'd. to C/B w/15" TRAP AS SHOWN

Air Test OK 4/18/75

PRUNUS SERRULATA 'KWANSAN' TOTAL 35 TREES TO BE PLANTED

LOW SHRUBS (TYP.)

(PERMIT # P 6855 Test OK 4/9/75 by Manning)
CONNECT TO EXISTING 48" P.S.D. 14 SK209

NOTES:

1. FOR GENERAL NOTES, LEGEND, ABBREVIATIONS AND PLOT PLAN, SEE DWG. NO. R.101
2. EXPLORATORY PITS (DENOTE TEST POINTS) BASED ON GEOLAB'S-WASHINGTON INC. SOILS INVESTIGATION REPORT NO. W-1225-90 DATED OCT. 7, 1974.
3. INSTALL CULVERT UNDER DRIVEWAY 11" x 17" CORRUGATED METAL ARCH 40' LONG - 16 GA. WITH FLARE ENDS SET ON EXISTING DITCH GRADE.
4. EXISTING DRAINAGE STRUCTURE SHALL BE VERIFIED IN FIELD AS TO LOCATION AND OUTLET PIPE SHALL BE EXTENDED BY SPLICING ADDITIONAL PIPE AS REQUIRED TO DAYLIGHT 4' AWAY FROM NEW A.C. PAVEMENT.
5. ALL REINFORCED CONCRETE PIPE SHALL BE CLASS IV. FOR PIPE BEDDING SEE 11 SK209
6. TOTAL PARKING SHOWN IN AREA - C = 249 UNITS. (PLUS 10 SPACES VISITOR PARKING)

REVIEWED BY WILSEY & HAM, INC.

DATE: DECEMBER 9, 1974
JOB NO 4834-90

SK206	GRADING AND PAVING PLAN AREA D
SK204	PLOT PLAN AREAS A THRU D

REFERENCE DRAWINGS

NO.	DATE	REVISIONS	BY
6	2-7-75 / 2-13-75	REVISED LOC. OF C.B. #4, ADDED TEST TEE. DELETED TEE AT C.B. #4 LOCATION	
5	2/6/75	CHANGED DWG NO./OLD NO. WAS 4834-R102	RCS
4	1/24/75	REV. STORM DRAIN SYSTEM, ADDED A.C. DRAIN FROM P.	DB
3	1/3/75	MOVED BLDGS, REGRADED, ADDED TREES & MOD. PARKING	DB
2	12-19	ADD PIPE 5.00 - DELETE TRAILER - ADD TREES	
1	12/9/74	Rev. Storm Drain & Details & Bldg. Location	HKM
		ISSUED FOR CONSTRUCTION	

AtlanticRichfieldCompany
North American Producing Division
General Engineering Group Dallas, Texas

AFE No.

PRUDHOE FACILITIES PROJECT - PRUDHOE BAY, ALASKA
PORT OF SEATTLE
GRADING PLAN AND CLEARING PLAN
AREAS A B C

THE RALPH M. PARSONS COMPANY
LOS ANGELES

4834-90-SK205 6 F

CONSTRUCTION

P-6786

Appendix D
Storm Sewer Video Survey

(included on CD-ROM only)

Appendix E
Diagram of Excavation Locations

Project No. 0091535.05
Date: 11/11/09
Drawn By: R. Olson
CAD File: G:\0091535\05\0091535-05.dwg

San. Sewer Easement
Property Boundary Line
Rail Silo
Tanks
Truck Wash
Additional Parking
Storage Silos
Load-out Silos
Exit
Deed line
Paved
Parking
Maintenance Building
Existing Office
Approximate Location of Existing DSI Storm Outfall
Property Boundary Line
Exist Conc Dock 55' x 500'
Duwamish Waterway
EXISTING DITCH
EXISTING DITCH
Existing Storm Outfall
Existing Transfer Tower
Line of Mean High Water (El 7.82 NAVD88)
Bay
10,000 Ton Barge
MW-16
MW-4S
MW-5S
MW-1S
MW-1D
MW-7S
MW-8S
MW-9S
MW-6S
MW-17
MW-10
MW-11
MW-2D
MW-12
MW-2S
MW-13
MW-22
AREA 3
AREA 4
AREA 2
AREA 1
NOT CONFIRMED
MW-21
MW-14
MW-23
MW-19
Property Boundary Line
Former City of Seattle SPU 48" Storm Sewer Outfall Discharge Location
Approximate Location of Existing Port of Seattle T115 Storm Outfall
Existing Aggregates
MW-24
MW-20
MW-18
MW-3D
MW-3S
MW-25
MW-26
MW-27
Property Boundary
Access to West Marginal Way
City of Seattle Storm Outfall Easement
Truck Entrance
City of Seattle Storm Outfall Easement
Existing City of Seattle Storm Outfall
WEST MARGINAL WAY

LEGEND
- Shallow Monitoring Well
- Deep Monitoring Well
- Property Line
- Approximate Excavation Area (July 2009)
- Approximate Excavation Area (October 2009)

NOTE: Locations of excavations are approximate based on field measurements (not surveyed).

CITY OF SEATTLE PUBLIC UTILITIES FEATURES
- Side Sewer and Lateral
- Sewer Drainage Mainline
- Manhole
- Catch Basin
- Drainage Outfall

N
0 50 100
FEET

Figure 1
Storm Sewer Excavation Areas
Glacier Northwest, Inc. - Reichhold, Inc. Site
5900 West Marginal Way SW
Seattle, Washington
ERM 11/09

Appendix F
Excavation Photographs

Photograph: *1*	*Central Excavation Area – looking northeast*	
Glacier-Reichhold Site *July 2009*	***ERM***	*5900 West Marginal Way SW* *Seattle, WA*

Photograph: *2*	*Central Excavation Area*	
Glacier-Reichhold Site *July 2009*	***ERM***	*5900 West Marginal Way SW* *Seattle, WA*

Photograph: *3*	*Western Excavation Area – looking west*	
Glacier-Reichhold Site *July 2009*	***ERM***	*5900 West Marginal Way SW* *Seattle, WA*

Photograph: *4*	*Western Excavation Trench*	
Glacier-Reichhold Site *July 2009*	***ERM***	*5900 West Marginal Way SW* *Seattle, WA*

Photograph: *5*	*Sewer Pipe Confirmation Excavation Area (after backfilling) – looking southeast*	
Glacier-Reichhold Site *October 2009*	***ERM***	*5900 West Marginal Way SW* *Seattle, WA*

Photograph: *6*	*Soil Horizons in Pipe Confirmation Trench*	
Glacier-Reichhold Site *October 2009*	***ERM***	*5900 West Marginal Way SW* *Seattle, WA*

Photograph: *7*	*Concrete Pipe in Southern Trench*	
Glacier-Reichhold Site *October 2009*	***ERM***	*5900 West Marginal Way SW* *Seattle, WA*

Photograph: *8*	*Close-up of Concrete Pipe in Southern Trench*	
Glacier-Reichhold Site *October 2009*	***ERM***	*5900 West Marginal Way SW* *Seattle, WA*

Photograph: *9*	*Backfilling of Central Excavation Area – looking south*	
Glacier-Reichhold Site *October 2009*	***ERM***	*5900 West Marginal Way SW* *Seattle, WA*

Photograph: *10*	*Central Excavation Area*	
Glacier-Reichhold Site *October 2009*	***ERM***	*5900 West Marginal Way SW* *Seattle, WA*